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Pre-kindergarteners' performance on the BTBC

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AN ABSTRACT OF THE THESIS OF Amelia Wittwer Ouellette for the Master of Science in Speech Communication with an emphasis in Speech Pathology presented May 14, 1986.

Title: Pre-kindergarteners' Performance on the BTBC

APPROVED BY THE MEMBERS OF THE THESIS COMMITTEE:


Robert Casteel, chairman


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Carrol Tama

The Boehm Test of Basic Concepts (BTBC) is designed to assess children's mastery of concepts considered necessary for academic achievement during the first years of school (Boehm, 1971). Although the BTBC was normed for kindergarten through second grade children on a group administration basis, the author suggests that the test can be administered to pre-kindergarten children on an individual basis. The BTBC's use with pre-kindergarten children has been researched, but it has not been determined whether pre-kindergarteners' performance on the BTBC will vary with respect to socioeconomic status (SES).

The purpose of this study was to detect the amount of variability in performance among low, middle and high SES pre-kindergarteners on the entire Boehm Test of Basic Concepts. The study sought to answer the following questions. What is the distribution of BTBC scores among low, middle and high SES pre-kindergarteners? Do the scores of pre-kindergarten children vary significantly as to socioeconomic status?

The present study consisted of individually administering the BTBC, Form A (BTBC-A) to 52 pre-kindergarten children divided among low, middle and high socioeconomic levels. The screening procedure, booklet 1 and booklet 2 of the BTBC-A were administered on separated days. During the data analysis the arithmetic means, standard deviations, standard errors of measure, t-tests for independant means, one-way analysis of variance and item analysis were conducted.

The results of the study suggest that while the high SES subjects are representative, and the low SES subjects may be representative, the middle SES subjects probably are not a representative sample. The results also suggest that children may earn higher scores on the BTBC when it is administered on an individual basis, and that preschool attendance may increase children's performance on the BTBC. The scores of both the middle (\bar{x} 37.9) and high (\bar{x} 35.5) SES groups vary significantly from the scores of the low (\bar{x} 25.2) SES group, while not varying significantly from each

other. These results are similar of Boehm's (1971) outcomes for kindergarten, first and second grade children, suggesting that the differences in BTBC performance between each SES group in the present study are not unusual, and as thus the BTBC remains sensitive to SES differences at a younger age. Furthermore, the results of the present study demonstrate that the BTBC can be administered in its entirety to low, middle and high SES pre-kindergarten children on an individual basis.

PRE-KINDERGARTENERS' PERFORMANCE
ON THE BTBC

by
AMELIA WITTWER OUELLETTE

A thesis submitted in partial fulfillment of the
requirement for the degree of

MASTER OF SCIENCE IN SPEECH COMMUNICATION

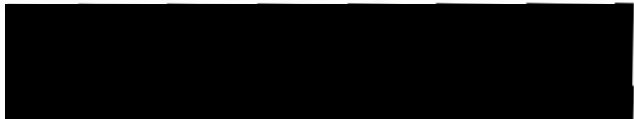
with an emphasis in
SPEECH-LANGUAGE PATHOLOGY

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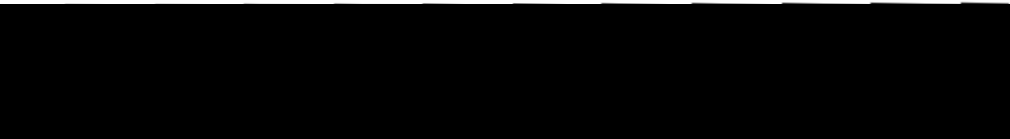
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CHAPTER I

INTRODUCTION AND STATEMENT OF PURPOSE

Introduction

The Boehm Test of Basic Concepts is designed to test concepts considered necessary for kindergarten children to understand the instructions given by their teachers (Boehm, 1971). Boehm contends that mastery of the concepts in her test are necessary for academic achievement in the first years of school. The BTBC was intended as a screening and teaching instrument to be used with kindergarten, first and second grade children. According to Bright (1973), the BTBC is useful in evaluating language-handicapped students' basic level of conceptual thinking, identifying children with poor comprehension, and identifying concepts not understood by children with no identified language deficit. Remediation and instruction of the unknown concepts can be accomplished by classroom teachers and speech-language pathologists (Bright, 1973).

The BTBC was normed for low, middle and high socioeconomic status (SES) kindergarten through second grade children during group administration, and the author suggests that the test can be adapted for pre-kindergarten administration. This would involve individual administration with the child pointing to rather than marking

responses. In the present study, the term "pre-kindergarten child" is defined as a child who will meet the age requirements for entering kindergarten the following year. No normative data for the BTBC's administration to pre-kindergarten children are provided in the test manual.

Although no normative data for pre-kindergarten children are available, the BTBC has been administered to this age group for identification (Bright, 1973; Clyne, 1973; Spector, 1979) and remediation (Bright, 1973; Central Arkansas Education Center, 1972b) purposes.

The BTBC has been administered to pre-kindergarten children for a variety of purposes. In regard to Bright's (1973) suggestions, the BTBC could also possibly be used by speech-language pathologists and preschool teachers to identify language-handicapped pre-kindergarteners' basic level of conceptual thinking, to identify pre-kindergarten children with poor comprehension, and to identify concepts not understood by pre-kindergarteners who do not have identified language deficits. Due to the lack of documentation concerning pre-kindergarteners' performance on the entire BTBC, the variability of pre-kindergarteners' performance on the BTBC, with respect to SES needs to be determined before Bright's (1973) identification uses, or any other identification purposes can be applied to the pre-kindergarten population.

Statement of Purpose

The purpose of this study is to detect the amount of variability in performance among low, middle and high SES pre-kindergarteners on the entire Boehm Test of Basic Concepts.

The results of this study will be used to answer the following questions:

What is the distribution of BTBC scores among low, middle and high SES pre-kindergarteners?

Do the scores of pre-kindergarten children vary significantly as to socioeconomic status?

Definition of Terms

For the purpose of this study, the following operational definitions were utilized:

Pre-kindergarten child - will be defined as a child who will meet the age requirements for entering kindergarten the following school year. Relating this definition to the subjects' birthdates, and the data collection dates, "pre-kindergartener" refers to children born on or between October 1, 1980 and October 1, 1981.

Pre-school - will denote children who do not meet the age requirements for attending public schools.

Concept - Although Boehm (1971) does not define her use of the term "concept" she states that children need to understand concepts evaluated by the BTBC in order to understand directions given by their teachers. In addition, Boehm obtained the concepts tested in the BTBC from directions and other portions of preschool and primary grade curriculum materials (Boehm, 1971). Therefore, in the present study, the word "concept" will refer to instructional terms which must be understood in order for a child to understand verbal directions given by his/her teachers.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

The Boehm Test of Basic Concepts (BTBC) was designed to assess children's mastery of concepts considered necessary for academic achievement during the first years of school (Boehm, 1971). The concepts evaluated by the BTBC were selected from preschool and primary grade science, reading and arithmetic curriculum materials. During a pilot study the number of concepts was reduced to 50. The 50 concepts are represented by pictorial multiple-choice items. Form A was published in 1969 and 1971, while Form B was not published until 1971.

Forms A and B both consist of 2 booklets, each containing 25 items. The items begin with simple concepts and progress towards more difficult ones; however items are not presented in an exact order of difficulty.

The present review of the literature will be presented under three subtopical headings: standardization, reliability and validity of the BTBC; the use of the BTBC with a variety of populations; and critical reviews of the BTBC.

Standardization, Reliability and Validity of the BTBC

Standardization

Information concerning the standardization of the BTBC is provided in the test manual (Boehm, 1971). Both booklets of Form A were standardized on a total of 6906 children from kindergarten, first and second grades. The children came from three socioeconomic (low, middle, high) backgrounds. The children lived in 21 cities from 15 states and provinces. The author states that she did not select a sample representative of the nation as a whole, because the BTBC was not intended for "administrative or predictive purposes, " but as a detection and instructional instrument. The test manual provides information on the performance of the standardization sample on the BTBC.

Ages for the children in the standardization sample are not provided in the test manual. Instead of reporting the performance of the subjects by specific age ranges, normative information is provided for each grade level by means of beginning of the year and mid-year performances, irrespective of the children's ages.

Form B (booklets 1 and 2) of the BTBC was not standardized. Normative information for Form B was estimated by using regression equations. These equations were developed when determining the equivalency of Forms A and B.

Reliability

The reliability of a test refers to the precision of the instrument and the consistency of the test scores (Peterson & Marquardt, 1981). Correlation coefficients will be used in the discussion of the reliability (and validity) of the BTBC. In order to understand and compare the various correlation coefficients, Guilford's (1956) interpretation of the strength of relations represented by the coefficients were:

less than .20	.....	Slight; almost negligible relationship
.20-.40	.....	Low correlation; definite but small relationship
.40-.70	.....	Moderate correlation; substantial relationship
.70-.90	.....	High correlation; marked relationship
.90-1.00	.....	Very high correlation; very dependable relationship (1956, p. 145)

The reliability of both forms of the BTBC was determined by computing split-half reliability coefficients and standard errors of measure (SEm) for each grade at each SES level. The coefficients of Form A ranged from .68 (moderate) to .90 (very high) while those for Form B ranged from .12 (slight) to .94 (very high). The SEm's for Form A ranged from 1.5 to 3.0, and from 1.7 to 3.4 for Form B. Table I displays the exact split-half reliability coefficients and SEm's for Forms A and B.

Alternate form reliability coefficients were computed to determine the consistency of measurement between Forms A and B. These coefficients ranged from .55 (moderate) to .92 (very high) with a median of .86 (high). The coefficients

TABLE I

SPLIT-HALF RELIABILITY COEFFICIENTS
AND STANDARD ERROR OF MEASURE FOR FORMS A AND B
(N=NUMBER, SD=STANDARD DEVIATION,
R=RELIABILITY COEFFICIENT,
SEm=STANDARD ERROR OF MEASURE)

FORM A						
<u>Grade</u>	<u>SES</u>	<u>N</u>	<u>Mean</u>	<u>SD</u>	<u>r</u>	<u>SEm</u>
Kindergarten	low	162	28.4	8.1	.86	3.0
	mid.	453	35.3	8.0	.90	2.5
	high	250	39.4	6.5	.85	2.5
	total	865			.90	2.7
First Grade	low	276	39.2	5.5	.82	2.3
	mid.	413	43.8	4.5	.82	1.9
	high	280	45.6	3.7	.76	1.8
	total	969			.85	2.1
Second Grade	low	222	43.5	5.0	.82	2.1
	mid.	349	46.7	2.7	.68	1.5
	high	242	47.8	2.6	.73	1.4
	total	813			.81	1.7
FORM B						
<u>Grade</u>	<u>SES</u>	<u>N</u>	<u>Mean</u>	<u>SD</u>	<u>r</u>	<u>SEm</u>
Kindergarten	low	39	31.6	8.4	.83	3.4
	mid.	72	40.5	5.7	.78	2.7
	high	47	36.6	7.0	.80	3.2
	total	158			.84	3.0
First Grade	low	60	39.8	7.1	.88	2.4
	mid.	88	45.7	2.9	.57	1.9
	high	70	44.7	3.4	.60	2.2
	total	218			.83	2.2
Second Grade	low	65	44.9	6.9	.94	1.7
	mid.	76	46.2	3.4	.62	2.1
	high	53	48.5	0.9	.12	0.9
	total	194			.87	1.7

for each grade at each SES level are displayed in Table II. The overall magnitudes of the alternate form reliability coefficients were lower than those of the split-half coefficients.

TABLE II
ALTERNATE FORM RELIABILITY COEFFICIENTS
FOR FORMS A AND B
(N=NUMBER, R=RELIABILITY COEFFICIENT,
SD=STANDARD DEVIATION)

<u>Kindergarten</u>			<u>First grade</u>			<u>Second grade</u>			
<u>low</u>	<u>mid.</u>	SES <u>high</u>	<u>low</u>	<u>mid.</u>	SES <u>high</u>	<u>low</u>	<u>mid</u>	SES <u>high</u>	
n	76	134	81	123	163	137	120	150	151
r	.58	.55	.76	.90	.68	.76	.92	.78	.63
Form A:									
mean	31.1	39.7	37.2	40.0	45.7	45.5	44.3	47.3	47.6
SD	9.6	5.8	5.8	7.1	3.4	3.8	6.4	2.6	1.9
Form B:									
mean	34.2	40.7	37.5	40.2	45.9	45.3	44.4	47.3	47.9
SD	7.4	5.2	6.8	6.6	3.1	3.5	6.3	3.0	1.8

(Boehm, 1971, p. 29)

The reliability of the BTBC has been further evaluated by administering it to middle SES kindergarten children, Navajo children, urban and rural children. Steinert (1978) evaluated the reliability of the BTBC with 60 middle SES kindergarten children. A Kuder-Richardson Formula 20 (KR 20) analysis a measure of internal consistency found the total BTBC score to have a .898 (high) reliability coefficient. The SEM for the total BTBC score was 2.658.

The BTBC's administration to non-traditional populations was evaluated by Rosenbluth (1976) and Houck, Biskin and Regetz (1973). The reliability of the BTBC for Navajo and English speaking children has also been evaluated (Rosenbluth, 1976). A group of Navajo children (kindergarten through second grade) were given a form of the BTBC in their native language. Using the KR 20, the Navajo reliabilities were .23 (low) for kindergarten (N=30), .75 (high) for first grade (N=46), and .65 (moderate) for second grade (N=50). During the study, the BTBC was also administered to first and second grade English speaking children in Albuquerque. The first grade reliability coefficient was .80 (high) (N=80), and .69 (moderate) (N=50) for the second grade children. The reliabilities for both the English speaking and Navajo children were lower than those obtained by Boehm (1971). Houck et al. (1973) compared the reliability coefficients of BTBC scores derived from urban and rural subjects. The BTBC was administered to 121 kindergarten and first grade children in a rural Appalachian county. The subjects were divided into high, middle and low SES groups determined by rating the occupation and education level of the chief income earner in each child's family. The rural reliabilities from these subjects were compared with the urban reliabilities in the BTBC test manual (Boehm, 1971). Significant ($p < .01$) differences in reliabilities were found to exist between urban ($r .90$, very high) and rural ($r .73$, high) middle

SES first grade children. According to Houck et al., the reliability differences seem to be a function of the greater variability in Boehm's (1971) normative sample and caution was suggested in using the BTBC to assess rural children (Houck et al., 1973).

Validity

Statistical information concerning the validity of the BTBC is not available in the test manual. The author defends this omission by the following statement:

For the Boehm Test of Basic Concepts, like any other test of educational achievement or mastery, validity is primarily a matter of the relevance of the test content to the school curriculum. This type of validity is usually called content validity. ...In the case of the BTBC, the test items were selected from relevant curriculum materials and represent concepts basic to understanding directions and other oral communications from teachers at the preschool and primary grade level. (Boehm, 1971, p. 29)

Test reviewers have criticized the BTBC for its apparently inadequate validation (Freeman, 1970; Lawlor, 1970; Noll, 1970; Proger, 1970). Subsequent researchers have evaluated the validity of the BTBC. Estes et al. (1979) evaluated the predictive validity of the BTBC by administering the BTBC to first grade, middle SES children at the beginning of the school year, and the primary battery of the Standardized Achievement Test (SAT) at the end of the school year. The Total SAT and BTBC scores had a positive correlation of .56 (moderate) ($p < .01$). The results of this study support Boehm's contention that basic concept mastery is related to academic achievement in the first years of

school (Estes et al., 1976).

Hutcherson (1978) evaluated the concurrent validity of the BTBC by administering Form A of the BTBC (BTBC-A) and the Peabody Picture Vocabulary Test , Form A (PPVT-A) to developmentally delayed children ages 5 to 7 years from low and middle socioeconomic levels. A positive correlation of .84 (high) ($p < .0005$) was found to exist between the tests. The results of the study indicate that the BTBC-A and PPVT-A evaluate similar abilities (Hutcherson, 1978).

Steinert (1978) studied the construct and criterion related validity of the BTBC in her doctoral dissertation. Construct validity was determined by comparing the BTBC with the Test for Auditory Comprehension of Language (TACL), Carrow Elicited Language Inventory (CELI), and Piagetian tasks. Additionally, the BTBC was compared with the Metropolitan Readiness Test (MRT) to determine criterion referenced validity. The subjects used in this study were kindergarten children from middle socioeconomic backgrounds. The total test scores on the BTBC and TACL had a .74 (high) ($p < .01$) Pearson product-moment correlation. Correlation coefficients were also determined for the three item categories (vocabulary, morphology and syntax) and the total BTBC score. The syntax category of the TACL and the total BTBC score have a positive .39 (low) ($p < .01$) correlation. There was a negative .34 (low) ($p > .05$) Pearson product-moment correlation between the BTBC and CELI (a test of syntactic structures), which resulted from an error score on

the CELI. The low correlations between the TACL syntax category and CELI with the BTBC indicate that the BTBC does not measure all aspects of language development (Steinert, 1978). More specifically, these results seem to suggest that the BTBC has a low correlation with syntactic development.

To determine cognitive aspects of the BTBC's construct, Steinert (1978) compared her subjects' performances on the BTBC and Piagetian tasks. Steinert changed the item classifications of the BTBC from space, time, quantity, and miscellaneous, to the following: space, number, seriation, time, miscellaneous. The changes involved reclassifying the items in the quantity category as either number or seriation items, and reassigning one of the spatial items (in order) to the seriation category. She regrouped the BTBC items to more easily compare them with the Piagetian tasks of space, number, seriation, time and classification. The Pearson product-moment correlations between the BTBC item groups and Piagetian tasks ranging from .20 (low) to .60 (moderate) were lower than those found between the BTBC and TACL scores. The correlation coefficients between BTBC item groups and Piagetian tasks are displayed in Table III. Steinert (1978) writes the following in explanation of the low to moderate correlation between the BTBC item groups and Piagetian tasks: "The BTBC may involve more general a cognitive factor which is moderately related to each of the Piagetian tasks."

TABLE III

PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENTS
BETWEEN BTBC ITEM GROUPS AND PIAGETIAN TASKS

Piagetian Tasks				
BTBC	Space	Number	Seriation	Time
Total	.46355**	.35750**	.46264**	.60354**
Space	.50317**	.29406*	.40301**	.60218**
Number	.34965**	.28013*	.31976*	.45310**
Seriation	.24572	.31651*	.44930**	.43199**
Time	.36568**	.20186	.41892**	.44269**
Miscellaneous	.31328*	.39230**	.32046*	.45762**

**p< .01

*p< .05

(Steinert, 1978, page 85)

Steinert (1978) compared the BTBC with the MRT to evaluate the criterion-related validity of the BTBC. A positive Pearson product-moment correlation of .51 (moderate) ($p < .01$) was found to exist between the BTBC and the MRT. The significance of the correlation supports Boehm's (1971) claim that knowledge of the BTBC concepts may be related to school achievement (Steinert, 1978). Steinert's moderate predictive validity finding may support the moderate predictive validity results from the Estes et al. (1979) study.

To determine if a positive correlation exists between performance on the BTBC and later academic success, Steinbauer and Heller (1978) administered the SAT to second and third graders who had taken the BTBC-A as kindergarteners. The BTBC-A was found to correlate positively with paragraph meaning (.56, moderate and .47, moderate), spelling (.54, moderate and .72, high), word study skills (.48, moderate and .47, moderate), language (.53, moderate and .93, very high), arithmetic computation (.58, moderate and .41, moderate) and arithmetic concepts (.65, moderate and .47, moderate) in second and third grades, respectively. All of these correlation coefficients were significant to the .01 level. These results suggest that the BTBC "successfully" predicts academic achievement (Steinbauer & Heller, 1978). The overall moderate correlation between the total BTBC scores and the SAT subtest scores is similar to the moderate predictive validity coefficients obtained by Estes et al.

(1979) and Steinert (1978).

Olinger (1979) evaluated the BTBC's validity in predicting reading achievement. The BTBC was administered to 55 kindergarten children, and the reading portion of the Iowa Test of Basic Skills (ITBS) was given to 42 of the same children when they were in second grade. A positive correlation of .60 (moderate) ($p < .01$) was found to exist between the two tests. This indicates a moderate correlation between the BTBC and ITBS. According to Olinger, the BTBC could be used with some degree of effectiveness in predicting future reading success. Olinger's finding that the BTBC is moderately predictive of later academic success is in agreement with previously cited studies.

Sarachan-Deily, Hopkins and DeVivo (1983) assessed the concurrent validity of the BTBC by comparing the BTBC with the Concept subtest of the Developmental Indicators of the Assessment of Learning (DIAL). The tests were administered to 95 kindergarten children in a semi-rural school system. No SES information for the subjects is available in the literature. The raw scores of the BTBC and DIAL Concept subtest were found to have a Pearson product-moment correlation coefficient of .94 (very high) ($p < .001$), indicating that the BTBC and DIAL Concept subtest evaluate similar abilities (Sarachan-Deily et al., 1983). This very high concurrent validity finding is similar to Hutcherson's (1978) finding of a high concurrent validity coefficient

between the BTBC and the PPVT.

The Use of the BTBC with a Variety of Populations

According to Boehm (1971), the BTBC was designed as a detection and instruction device for children in kindergarten, first and second grades. Subsequent researchers have administered the BTBC for detection, remediation, and curriculum evaluation, as well to populations with disabilities. Non-traditional populations have also been given the BTBC.

The Central Arkansas Education Center (1972b) used the BTBC to detect verbal deficiencies in children from low socioeconomic backgrounds. The results were then used as a guide for remediation.

The BTBC has been used extensively to evaluate curriculum. The Central Arkansas Education Center (1971) administered the BTBC to evaluate a first grade reading program. Researchers have used the BTBC to evaluate kindergarten (Boulder Valley School District, R-2, 1975; Hartford Follow-Through Report I, 1972; Howell, 1975; Paterson Board of Education, 1971) and preschool (Cincinnati Public Schools, 1973; Jones, Taitt, Washington & Silcott, 1975; Lindstrom & Tannenbaum, 1970) program curriculum. Jones et al., (1975) administered the entire BTBC to four, five and six year old children. The authors did not indicate whether or not the BTBC was administered in a group setting or on an individual basis. The BTBC has also been used as a pre- and posttest for measuring the

effectiveness of a Language Master (A machine which "reads" cards affixed with a piece of magnetic tape. The magnetic tape has a word recorded on it, while the card displays the printed form of the same word. As the Language Master "reads" a card the child is simultaneously given auditory and visual representations of the target word) in emphasizing the reading skills in mentally retarded students (Central Arkansas Education Center, 1972a).

The literature indicates that the BTBC has been administered to populations with disabilities, specifically hearing-impaired students, children with learning disabilities and high risk and disadvantaged children. Davis (1974) investigated the performance of public school hearing-impaired students (ages six to eight) on the BTBC. The results of the study revealed that when compared with norms for children their age or younger, 75 percent of the hearing-impaired children scored at or below the 10th percentile.

The BTBC was administered to children to detect learning disabilities (LD) and to provide information about this group. Clyne (1973) and Spector (1979) both used the BTBC to identify children with potential learning disabilities. Spector also speculated on why children may not correctly respond to the test items on the BTBC. These reasons include the following: 1) inability to focus on key words in the directions; 2) complexity of directions; 3) deficits in spatial perceptions; 4) lack of knowledge of the

concept labels; 5) difficult level of abstraction; 6) difficulty with negative words and; 7) poor auditory memory for sentences. Kavale (1982) administered the BTBC to children with LD and normal first grade children to determine whether performance differences exist between these populations and the nature of any existing differences. He found the children with LD to have a lower level and greater variability in their understanding of basic concepts. The children with LD had greater discrepancies in the categories of quantity, space and miscellaneous, as compared with normal children.

Normal, disadvantaged and high risk first graders were given the BTBC in order to correlate concept attainment with reading achievement by these three groups (Henkin, 1977). The results of the study showed a positive correlation between reading achievement and concept attainment among the subgroups and the total sample. The disadvantaged and high risk children, as a group were found to be deficient in reading achievement and concept attainment. No significant differences were found between disadvantaged male and female students, but differences were found between the normal males and females. Differences between the performances of high risk males and females were not discussed.

Researchers have administered the BTBC to non-traditional populations such as Canadian Indian, bilingual (Spanish/English), Navajo and Appalachian children. Indian and non-Indian Canadian kindergarten children were given the

BTBC in order to compare the verbal concept development of these two populations (Mickelson & Galloway, 1973). Significant differences were found to exist between the verbal concept development of the two populations, in favor of the non-Indian children.

Harrison (1975a, 1975b, 1976a, 1976b) utilized Spanish and English versions of the BTBC to evaluate bilingual education programs.

Rosenbluth (1976) used a Navajo translation of the BTBC to assess the feasibility of translating English tests into Navajo, in order to evaluate the language development of kindergarten and first grade Navajo children. Syntactic and linguistic differences between Navajo and English make it infeasible to translate the BTBC into the Navajo language. A more feasible way to assess the language development of kindergarten and first grade Navajo children would be to write a Navajo concepts test modeled after the BTBC. The resultant test, however, would evaluate Navajo, not English language development (Rosenbluth, 1976).

Besides translation, the BTBC has been modified. The BTBC was altered and used to measure the knowledge of basic concepts of low SES Appalachian preschoolers' (Levin, Henderson, Levin & Hoffer, 1975). The altered BTBC, named the Central Susquehanna Boehm Test (CSBT), used booklet A-1 of the BTBC materials, and was administered on an individual basis. The CSBT also includes instructions to the examiner, some of which follow:

We want to find out which concepts the child understands. We do not want a measure of his attention span, cooperativeness, distractability, ability to use a crayon, and so on. ...Equivalent words may be substituted...Provide encouragement mostly between items and in general terms, e. g., "You're doing well!" "You're trying hard." (Levin et al., 1975, pp. 133, 134)

The CSBT was normed on preschool children attending Headstart programs and Title IV-A funded Day Care Centers. Two sample groups were used in norming the CSBT. Sample I included all 166 children in the study. The mean age for this group was 48.7 months (4.9 months standard deviation). Sample II consisted of all the children in sample I for whom concurrent California Preschool Social Competency Scale (CPSCS) and PPVT scores were available. The mean age for the 149 children in sample II was 48.1 (5.6 months standard deviation).

Besides normative data, the reliability and validity of the CSBT were also determined. Internal consistency reliability (.72-high), test-retest reliability (.76-high) stability-alternate form reliability (.80-high) and the reliability of performance on individual items were computed for the CSBT. The concurrent validity of the CSBT was determined by comparing the raw scores on the CSBT with the PPVT (.62-moderate) and CPSCS (.41-moderate) raw scores. The authors predicted that the BTBC would correlate highly with the PPVT (a vocabulary test) and relatively low with a social competence scale like the CPSCS. No reasons are given for these predictions. This writer would also predict that the BTBC would correlate more highly with a vocabulary

test than a social competence scale, due to the fine line between the definitions of "vocabulary" and "concept", "vocabulary development" and "concept development".

Critical Reviews of the BTBC

Validity

In discussing the validity of the BTBC, test reviewers have primarily criticized the lack of validation information provided in the test manual (Freeman, 1970; Lawlor, 1970; Proger, 1970). According to Boehm (1971), the BTBC has adequate validity because the test items were selected from school curriculum. Adequate information on how items were selected from the curriculum are not provided according to Freeman (1970); however McCandless (1972) and Noll (1970) support Boehm's (1971) claim that the BTBC has adequate validity.

Subsequent researchers have conducted studies to determine the validity of the BTBC. In reference to content validity, Estes et al, (1979) determined that the BTBC has a moderate ($r .47$; $p < .01$) correlation with the SAT, and Hutcherson (1978) found a $.84$ (high) ($p < .0005$) correlation between the BTBC and the PPVT. In evaluating the construct validity of the BTBC, Steinert (1978) found a high $.74$ ($p < .01$) correlation between the BTBC and the TACL. Steinert also determined that a moderate $.51$ ($p < .01$) correlation exists between the BTBC and the MRT, while evaluating the former's criterion related validity. Due to the moderate

.60 ($p < .01$) correlation between and BTBC and the reading portion of the ITBS, Olinger (1979) suggests that the BTBC has some degree of effectiveness in predicting reading achievement.

Reliability

Reviewers regard the BTBC as too easy for all second grade children, and those in first grade from middle and high socioeconomic backgrounds (McCandless, 1972; Noll, 1970). Noll (1970) explains that the BTBC is adequate in difficulty only for kindergarten and low SES first grade children. The reliabilities for low, middle and high SES kindergarten and low SES first grade children are .86, .90, .85 and .82, respectively, "surprisingly good" according to Noll (1970). Lawlor (1970) thinks that pre-kindergarten children should have been included in the standardization sample. McCandless (1972) also criticizes the standardization study, stating that the number of low SES children from a southern city is disproportionate.

Construction

Reviewers write mixed reactions to the construction of the BTBC. The BTBC has been complimented for the clarity of drawings (McCandless, 1972) and the non-white people represented in the test booklet illustrations (Lawlor, 1970). The simplicity of the test protocol and scoring procedures (Lawlor, 1970; McCandless, 1972; Noll, 1970; Smock, 1972), as well as the usefulness of the interpretation and

remediation sections of the test manual (McCandless, 1972; Proger, 1970; Smock, 1972) have also been praised.

Conversly, reviewers have negatively critiqued the administration protocol of the BTBC. After administering the BTBC to kindergarten children for three years, Spector (1979) found reasons why children may fail to respond correctly to test items. Among the seven reasons which he detected, five can be applied to the test's administration procedures: 1) inability to focus on key words in the directions; 2) complexity of directions; 3) lack of knowledge of the concept label; 4) difficult level of abstraction and; (5) poor auditory memory. Additionally, Boehm (1971) suggests that children may miss test items because the concepts are inherently difficult, specific label or alternate concept labels are unknown, and/or pictorial representations are ambiguous or outside the children's relm of experience. Levin et al. (1975) did not directly criticize the BTBC's administration instructions, but the following is included in their justification for a modified version of the BTBC; "We do not want a measure of the child's attention span, cooperativeness, distractability, ability to use a crayon, and so on."

Thus, test reviewers initially criticized the BTBC's lack of validation information. Some of these criticisms were refuted by subsequent research. Boehm's failure to state where and how she selected items for the BTBC has not been refuted. The reviewers found the BTBC to be best

suited for kindergarten and low SES first graders because it seems to be easy for the rest of the population for which it was normed (McCandless, 1972; Noll, 1970). The reviewers praise the clarity of the item illustrations, test protocol, interpretation and remediation information included in the BTBC. Boehm (1971) and Spector (1978), however, warn that failure to respond correctly may be due to inherent difficulty with the pictorial representations and/or test protocol.

Summary

In summary, the Boehm Test of Basic Concepts was designed to assess children's mastery of basic concepts. Normative information is available for kindergarten, first and second grade children at low, middle and high socioeconomic levels. Boehm (1971) evaluated the reliability of the BTBC using split-half and alternate form reliability coefficients. Other researchers determined the reliability of the BTBC's administration to middle SES kindergarten children, Navajo children, and urban vs. rural kindergarten and first grade children. Although Boehm did not evaluate the validity of the BTBC, subsequent researches have. The BTBC has been administered for detection, remediation and curriculum evaluation purposes, as well as to populations with disabilities. Additionally, it has been utilized with non-traditional populations. Reviewers originally criticized the BTBC's lack of validation, but subsequent researchers refuted some of these criticisms. The BTBC was

found to be best suited for kindergarten children and low SES first grade children. Mixed reactions to the BTBC's construction are provided by the reviewers.

CHAPTER III

METHODS AND PROCEDURES

Methods

Subjects

The 52 subjects in this study were selected from these preschools: Family Treehouse Preschool, The Marlyhurst College Preschool, two headstart preschools, and the Catlin Gable preschool. The subjects were divided into three socioeconomic status (SES) groups. The high SES group contained 24 children, the middle SES group contained 8, and there were 20 children in the low SES group. Subjects for each SES group were selected from the group of children which met the following criteria:

- 1) The parent or guardian signed and returned a release form giving permission for the child to participate in the study (see Appendix A).
- 2) The child received no more than 9 months of preschool as indicated by the parent or guardian (Appendix A) and/or teacher, director or school records.
- 3) At the beginning of the following school year the child will be old enough to enter kindergarten, indicating a birthdate on or between October 1, 1980 and October 1, 1981.

- 4) The child was able to respond to the Peabody Picture Vocabulary Test-Revised, form L (PPVT-L).
- 5) The child passed a puretone audiometric screening test for the better ear, administered at 20 dB HL for the frequencies of 1000, 2000 and 4000 Hz.
- 6) The child did not have any obvious physical, intellectual, or emotional handicaps (such as Down's syndrome, autism, blindness) which could preclude him/her from performing on the PPVT and BTBC as indicated by the teacher.

The subjects in the present study, like those in Boehm's (1971) study were selected with no preference to sex.

Unlike the present research, the BTBC author reports that the socioeconomic levels of the children in her study were determined by the school which they attended. The socioeconomic level of the primary area from which the school drew its enrollment was used as the children's socioeconomic level (Boehm, 1971).

The SES groups in the present study, except for the subjects attending two headstart preschools, were determined by using a modification of the United States Bureau of Census Working Paper Number 15, Methodology and Scoring of Socioeconomic Status (1963). The procedure involved assigning a number between 1 and 100 to the occupation of the chief income recipient in the child's family. Ratings from 1 to 40 were considered low SES,

ratings from 41 to 83 were considered middle SES, and high SES ratings ranged from 84 to 100.

Information on the occupation of the chief income recipient in the child's family was obtained by consulting school records, the child's teacher or the school principal/director.

Eligibility to attend a Headstart program is based on socioeconomic status; only children from families with low socioeconomic status are able to attend Headstart preschools. Therefore, the subjects attending the Headstart preschools were placed in the low SES group, without rating the family according to the chief income earner's occupation.

In the test manual the author does not state the subjects' racial backgrounds. In the present study, the low SES group was predominately black, while the children in the middle and high SES group were all white except for an oriental child in the high SES group.

Instrumentation

The Boehm Test of Basic Concepts (BTBC) (Boehm, 1971) consists of 50 multiple choice pictorial items presented in two booklets. The items begin with simple concepts and progress towards more difficult ones, but are not presented in an exact order of difficulty. The items are equally divided between the two booklets. The concepts evaluated by the test have been categorized into the classifications of space, time, quantity and miscellaneous.

Two forms of the BTBC are available, Form A was published in 1969 and 1971, while Form B was only published in 1971. Both forms are designed to measure the same concepts and have been found to yield equivalent raw scores (Boehm, 1971).

Although two forms of the BTBC, each containing two booklets, are available, only Form A was used in the present study. Form A was chosen because it has a higher total split-half reliability coefficient (.90) than Form B (.84) at the kindergarten level (Boehm, 1971).

Procedures

Screening

The hearing screening and PPVT-L were administered in a quiet room. To familiarize the subjects with the examiner, she visited and observed each class two to four weeks before the screening and testing. These visits occurred on two separate days, for approximately 45 minutes each day. The hearing screening and PPVT-L were then administered.

The hearing screening was administered first, starting with the child's right ear. Both ears were screened only when a child did not pass the screening of his/her right ear.

When a child passed the hearing screening, the PPVT-L was administered. The test manual instructions were followed during the test administration.

Test Administration

The administration of the BTBC-A occurred in the same room, but on separate days, as the screening. Booklets 1 and 2 were administered on separate days to avoid subject fatigue during the administration of booklet 2. The procedures used during the administration of both booklets were the same. During the BTBC administration, the subject sat to the left of the examiner. The booklet was placed in front of the child, with one page exposed at a time. The response form was situated in front of the examiner. The administration directions recommended by the author (Boehm, 1971) were followed, with alterations. These alterations involved omitting and changing sections to make the directions more appropriate for individual test administration. In the test manual the examiner is instructed to reinforce the children between the sample and test items. Although no other reinforcement phrases are indicated in the group administration, specific reinforcement phrases were added to keep the subject on task. The directions used in this study can be found in Appendix B. The testing occurred during the first three weeks of December, 1985.

Scoring

During the test administration, all responses were recorded. Columns on the response form were provided for marking correct and incorrect responses. A check (✓) was used to record each subject's response in the appropriate

column (see Appendix C). The number of correct responses was totaled to determine the raw score.

Data Analysis

The data analysis consisted of determining the arithmetic means, standard deviations, standard errors of measure, and a t-test analysis for independent means in all groups (low vs. middle, low vs. high, high vs. middle). A one-way analysis of variance and an item analysis were also conducted. The arithmetic mean, standard deviation and standard error of measure were determined for each SES group.

CHAPTER IV

RESULTS AND DISCUSSION

Results

The stated purpose of this study is to detect the amount of variability in performance among low, middle and high SES pre-kindergarteners on the entire Boehm Test of Basic Concepts (BTBC). The results of the study will be used to answer the following questions. What is the distribution of BTBC scores among low, middle and high SES pre-kindergarteners? Do the scores of pre-kindergarten children vary significantly as to socioeconomic status?

The data analysis consisted of a 2-tailed t-test for independent means (high vs. middle, middle vs. low and high vs. low), a one-way analysis of variance and an item analysis. Except for the item analysis, the above analyses were computed using the Statistical Package for the Social Sciences computer program. The means, standard deviations and standard error of measures were calculated for each SES group during the t-test (Table IV). The pooled variance estimate t-values for each pair of SES groups were also determined. The middle SES group performed better than the high SES group, however, when the high and middle SES groups' BTBC scores were compared, a t-value of .95 was found, which was not significant to the .05 level. A

t-value of 5.73 was found when the middle and low SES groups' BTBC scores were compared. This revealed that the middle SES group's performance was significantly better ($p <$ high and low SES groups' BTBC scores were compared, a t-value of 5.45 was found, which revealed the high SES group performing better than the low SES group beyond the .001 significance level. The t-test values are displayed in Table V.

TABLE IV

THE NUMBER OF SUBJECTS (n), ARITHMETIC MEAN (x), STANDARD DEVIATION (SD), AND STANDARD ERROR OF MEASURE (SEm) FOR EACH SES GROUPS' BTBC SCORES

SES	n	x	SD	SEm
low	20	25.20	5.84	1.31
middle	8	37.88	3.27	1.16
high	24	35.54	6.59	1.35

TABLE V

THE T-VALUES RESULTING FROM THE COMPARISON OF ALL OF THE SES GROUPS (HIGH VS. MIDDLE, MIDDLE VS. LOW, HIGH VS. LOW)

SES	Middle	Low
High	.95*	5.54**
Middle	--	5.73**

* NS

** $p < .001$

In addition to the t-test performed on all of the data, a series of t-tests were conducted with some subjects excluded. In the first analysis, three low SES subjects who earned PPVT-L scores below the first percentile were excluded. A non-native English speaking high SES subject was excluded in the second analysis. When the results from each of these t-tests were compared with the results from the t-test containing all of the data, no essential differences were noted in the means and standard deviations of each SES group. Therefore the results and discussion are based on information from all of the data.

A one-way analysis of variance was performed to determine the distribution of BTBC scores among the low, middle and high SES pre-kindergarteners, as well as to determine if there was a significant linear trend between the means of the three SES groups. The highest possible score on the BTBC is 50. The scores across the SES groups ranged from 13 to 46. The scores for the low SES group ranged from 13 to 40, while the middle SES scores ranged from 34 to 44. The scores for the high SES group ranged from 22 to 46. A significant linear trend was found to exist between the means of the three SES groups. Figure 1 displays the BTBC scores, means and standard deviations of the low, middle and high SES subjects.

An item analysis was performed to determine the total percentage of subjects in each SES group correctly answering each item (see figure 2), as well as the percentage of the

entire sample correctly answering each item. The percentage of subjects correctly answering each item ranged from 17 percent to 98 percent. The percentage of low SES subjects correctly answering each item ranged from 5 percent to 100 percent. The percentage of middle SES subjects correctly answering each item ranged from 12 percent to 100 percent. The percentage of high SES subjects correctly answering each item ranged from 17 percent to 100 percent. Figure 2 displays the concepts tested in each item on the BTBC, the percentage of low, middle and high subjects correctly answering each item, and the percentage of the entire sample correctly answering each item.

Discussion

The first question that was posed in the present study was, what is the distribution of BTBC scores among low, middle and high SES pre-kindergarteners? During this discussion the score distributions for each SES group of pre-kindergarten children participating in the present study will be described. The results of the present study will then be compared to other studies in which the BTBC was administered to kindergarten and preschool children from low, middle and/or high socioeconomic backgrounds.

The distribution of the middle SES group's BTBC scores will be described first, followed by a description of the high and low SES groups' score distributions. The following analyses will be based on figure 1. The middle SES subjects

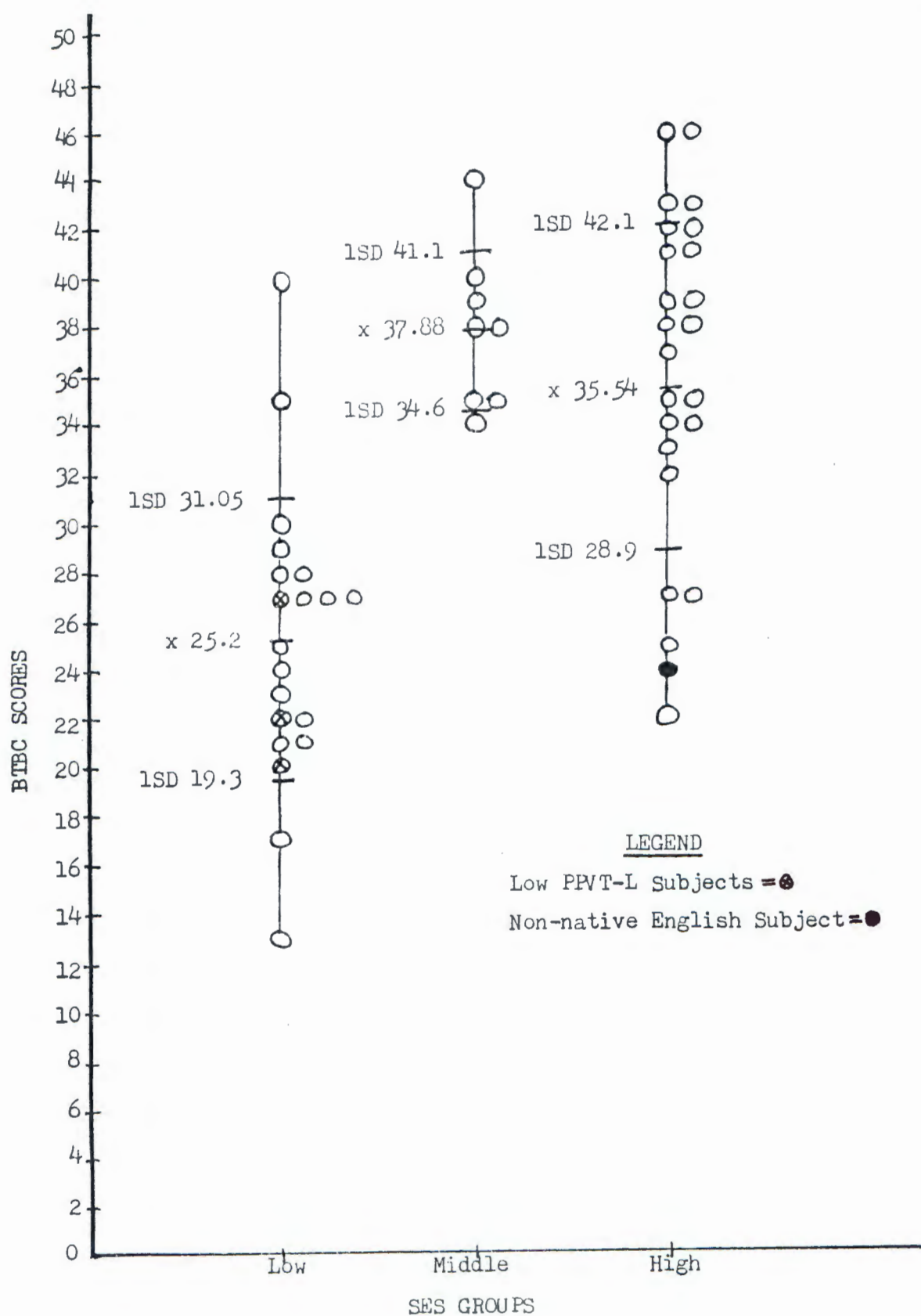


Figure 1: The BTBC scores, means, and standard deviations of the low, middle and high SES pre-kindergarten subjects.

Item No./Concept	Low	Middle	High	Sample
1. top	70	87	100	87
2. through	95	100	96	96
3. away from	80	87	96	88
4. next to	90	100	100	96
5. inside	95	100	100	98
6. some but not many	80	87	87	85
7. middle	75	100	92	87
8. few	55	100	92	79
9. farthest	80	100	100	92
10. around	95	100	100	98
11. over	75	100	96	88
12. widest	40	100	79	67
13. most	75	87	83	81
14. between	60	100	87	79
15. whole	65	62	68	62
16. nearest	100	100	96	98
17. second	10	60	52	40
18. corner	55	87	75	69
19. several	60	100	96	83
20. behind	90	87	92	90
21. row	65	87	87	79
22. different	55	87	79	71
23. after	55	37	62	56
24. almost	75	75	75	75
25. half	35	50	58	48
26. center	60	87	50	60
27. as many	35	100	5	63
28. side	60	70	67	62
29. beginning	25	100	67	56
30. other	45	75	71	62
31. alike	25	50	58	44
32. not the first or the last	20	100	75	48
33. never	10	75	46	37
34. below	55	100	87	77
35. matches	50	62	62	58
36. always	30	75	58	50
37. medium-sized	25	50	71	50
38. right	35	50	50	44
39. forward	25	62	54	44
40. zero	10	62	58	40
41. above	50	100	92	77
42. every	75	87	83	81
43. separated	40	100	54	56
44. left	25	75	46	42
45. pair	10	25	33	23
46. skip	10	12	25	17
47. equal	5	50	21	17
48. in order	25	37	42	35
49. third	30	37	17	19
50. least	25	12	29	25

Figure 2: The percentage of the entire sample and each SES group correctly answering each item.

performed within a tight range of scores (34-44) (figure 1), which may be due to the middle SES group being composed of only eight subjects who attended the same preschool.

This writer planned to obtain more than eight middle SES subjects from the same preschool, but a number of potential subjects contracted chicken pox during the data collection period. No middle SES subjects were obtained from the other preschools because two were attended exclusively by low SES children, and the other two were attended by high SES subjects. This writer did not specifically look for middle SES preschools, because she assumed that it would be easy to obtain an adequate number of middle SES subjects.

Although t-tests were not run to compare the pre-kindergarteners' BTBC performances by schools, this writer hypothesizes that the exceptional performance of the eight middle SES subjects attending this preschool is due to it being a cooperative preschool. Cooperative preschools require parents to assist in the class a specific amount of time each week, which probably facilitates carry over of school learning into the home environment.

The subjects in the middle group passed 34-44 out of 50 items on a test designed for kindergarten through second grade children, suggesting that these eight subjects represent the population of middle SES pre-kindergarteners who earn high scores on the BTBC, rather than depicting a representative sample of the total population of middle SES

pre-kindergarten children.

While the middle SES subjects performed within a tight range of scores, the scores for the high and low SES groups ranged from 22 to 46 and 13 to 40, respectively (figure 1). The scores for both the high and low SES groups clearly separate into distinct subgroups. The high group's scores divide into two subgroups ranging from 32 to 46, and 22 to 27. The scores for the low SES group separate into four subgroups, ranging from 33 to 40, 27 to 30, 20 to 25, and 13 to 17. One SD above the mean for the low SES group (31.05) separates the high SES group into two subgroups, as well as dividing the first two low SES subgroups. The low SES mean (25.2) divides the second and third low SES subgroups. Either of low SES mean or one SD above the low SES mean could possibly be used as cut-off scores, to identify children who might require remediation or facilitation in the area of basic concepts.

The performance of an additional subgroup of subjects may lend support to the use of cut-off scores. While investigating the performance of the three SES groups in the present study, a subgroup of potentially at risk children were identified. The at risk group included three children (low SES) who scored below the first percentile on the PPVT-L, and one non-native English speaking child (high SES). A series of t-tests were conducted to determine if the four potentially at risk subjects should be included in the study. Although no significant differences were noted

between the results of these t -tests and the t -test including all of the subjects, the entire subgroup of potentially at risk children scored within one SD of the low SES mean (see the legend on figure 1). This finding supports the earlier suggestion that either the first SD above the low SES mean, or the low SES mean could be used as a cut-off score to identify children who could benefit from instruction in the area of basic concepts.

In addition to describing the distribution of BTBC scores of each SES group, the results of the present study were compared to studies in which the BTBC was administered to low, middle and high SES kindergarteners (Boehm, 1971), low SES preschool children (Levin et al., 1975) and middle SES kindergarten children (Steinert, 1978). The reasons for choosing these three studies for comparison with the current research data are that Boehm represents standard norms and standard group administrations for beginning of the year kindergarteners; Steinert represents middle SES kindergarten children who were administered the instrument on an individual basis; and Levin et al. represents pre-kindergarten performance of low SES subjects on the first half of the instrument and administration of the test on an individual basis.

The scores of each SES group in the present study were compared with the beginning of the year kindergarten (BYK) norms provided in the BTBC manual (Boehm, 1971). In order to determine how the pre-kindergarten subject performed in

relation to the BYK subjects in Boehm's study, the raw scores of the pre-kindergarten subjects were imposed on the percentile equivalents of the BYK's raw scores for purposes of comparison. The percentile equivalents for the low SES pre-kindergarten children in the current study ranged from 10 to 97, with the mean at the 50th (\bar{x} 25.2) percentile for Boehm's low SES BYK subjects. The middle SES pre-kindergarteners' percentile equivalents ranged from 60 to 99, with the mean falling at the 70th (\bar{x} 37.9) percentile for Boehm's middle SES BYK subjects. The percentile equivalents for the high SES pre-kindergarteners ranged from 5 to 97, with the mean at the 45th (\bar{x} 35.5) percentile for Boehm's high SES BYK subjects. The percentile equivalents for the low, middle and high SES kindergarteners ranged from 1 to 100, with means at the 50th (\bar{x} 25.5), 50th (\bar{x} 31.8), and 45th (\bar{x} 35.8) percentiles, respectively. The differences between the pre-kindergarteners' and kindergarteners' percentile equivalents may be due to the BTBC being administered to the pre-kindergarten children on an individual basis in this study, while it was administered to the kindergarten children in a group setting in Boehm's (1971) study. The individual administration of the BTBC to pre-kindergarten children was suggested by Boehm (1971), but she did not mention that pre-kindergarten children would earn higher comparative scores on the BTBC when administered on an individual basis. The above findings could suggest that children in low and middle socioeconomic levels earn

higher scores on the BTBC when it is administered on an individual basis. Since the pre-kindergarten groups in the present study were six months to a year younger than the kindergarten children these findings may also indicate that the high SES children earn higher scores on the BTBC when it is administered on an individual basis. This writer did not expect the pre-kindergarten subjects in her study to perform as well as the kindergarten subjects in Boehm's study. The surprisingly high scores earned by the present study's subjects could indicate that these are above average pre-kindergarteners who do not from a representative sample of low, middle and high SES pre-kindergarten children.

One-to-one similarity exists in the high and low SES pre-kindergarteners' percentile equivalent ranges when compared to those obtained by the BYK children. The BYK percentile equivalents might be used to determine raw scores on the BTBC if a larger sample of 4 year olds performed in a similar manner.

As with the present study, Levin et al. (1975) administered the BTBC to children on an individual basis, but they administered only the first 25 items of the BTBC-A and evaluated only low SES children. The 166 rural and urban low SES appalachian preschoolers ranged in age from 2.10 to 5.9 years. The children were divided into six groups by chronological age. The mean BTBC scores for the 44 preschoolers in the 3.10 to 4.3 year old group was 11.99, with a SD of 4.26. The mean and SD for the 33 preschoolers

in the 4.4 to 4.9 year old group were 14.45 and 4.51, respectively. The mean score for the 11 preschool children in the 4.10 to 5.3 year old group was 14.90, with a SD of 3.97.

The pre-kindergarten subjects in the present study ranged in age from 4 to 5 years. The mean and SD for the low SES pre-kindergarteners' performance on the first 25 items of the BTBC were 17.3 and 3.31, respectively. The differences between the mean BTBC scores of the three Levin et al. (1975) preschool groups and the low SES subjects in the present study may be due to the fact that the Levin et al. subjects were tested during the first two months of their first year of preschool, while the subjects in the present study may have attended up to 9 months of preschool prior to the 1985-86 school year. These findings may suggest that preschool attendance increases children's performance on the BTBC when looking at the first 25 items only for the purpose of comparison of the present study with the Levin et al. (1975) study.

As with the present study and the Levin et al. (1975) study, Steinert (1978) administered the BTBC to children on an individual basis. Steinert (1978) administered the BTBC-A to 60 white, middle class kindergarten children. The total mean score for this group was 34.38, with a SD of 8.43 and a range of scores from 11 to 47. The mean for the middle SES kindergarten children in Steinert's study was lower than the mean (37.9) obtained by the middle SES pre-

kindergarten children in the present study, supporting the earlier suggestion that the middle SES subjects in the present study may not be representative of all middle SES pre-kindergarteners.

The Boehm (1971), Levin et al., (1975), and Steinert (1978) studies, as well as the present study each used a different method to determine subjects' socioeconomic levels. Because of this, the low, middle and high SES subjects in each study may not sample the same populations. High SES is easier to identify so they are probably more equal across studies. Kindergarten children are older than pre-kindergarten children, and have had more opportunity to learn. Therefore, kindergarten children should perform better on the BTBC than pre-kindergarten children. Only in the high SES groups did Boehm's (1971) BYK subjects perform better on the BTBC than the pre-kindergarten children in the present study. This suggests that the high SES pre-kindergarten subjects in the present study may be a representative sample.

The second question in the present study was, do the scores of pre-kindergarten children vary significantly as to socioeconomic status? The results of the study reveal that the scores of both the middle and high SES groups vary significantly from the scores of the low SES group, while not varying significantly from each other.

Significant differences between the performance of high and low SES children on measures of language have been

found in the literature (Templin, 1957). Significant differences have also been found between the performance of middle and low SES children on language tests (Lawton, 1968; Milner, 1951). This suggests that the significant differences between both the middle and low, and high and low SES groups are not unusual.

The result of Boehm's (1971) study support the earlier suggestion that the significant differences between the high and low, and middle and low SES groups' BTBC means are not unusual, as well as suggesting that the non-significant difference between the means for the high and middle SES groups is not unusual. The differences between the means for the kindergarten, first and second grade middle and high SES subjects in Boehm's (1971) study range from .4 to 4.0. The differences between the low and middle, and low and high SES subjects' means range from 4.7 to 9.2 and 6.1 to 10.3, respectively. In the present study, the differences between the middle and high SES groups' means is 2.34, while the difference is 12.34 between the low and middle SES groups' means. The difference between the low and high SES subjects' means is 10.34. These results are similar to Boehm's (1971) outcomes for kindergarten, first and second grade children, suggesting that the differences in BTBC performance between each SES group in the present study are not unusual, and as thus the BTBC remains sensitive to SES differences at a younger age.

The results of the present study also demonstrate that

the BTBC in its entirety can be administered to pre-kindergarten children on an individual basis.

In summary, the results of the present study suggest that while the high SES subjects are representative, and the low SES subjects may be representative, the middle SES subjects probably are not a representative sample. It is not surprising that the small number (eight) of middle SES subjects do not form a representative sample of middle SES subjects. The results also suggest that children may earn higher scores on the BTBC when it is administered on an individual basis, and that preschool attendance may increase children's performance on the BTBC. The similarity of the low and high SES pre-kindergarteners' BTBC scores to the BTBC scores of the BYK children in Boehm's (1971) study suggest that the BYK percentile equivalents could be used to determine percentile equivalents for low and high SES pre-kindergarteners' raw scores on the BTBC, if a larger sample of pre-kindergarteners perform in a similar manner. The results also suggest that either one SD above the mean for the low SES group or the low SES mean could be used as a cut-off score to identify children who may need remediation in the area of basic concepts. The scores of both the middle and high SES groups vary significantly from the scores of the low SES group, while not varying significantly from each other. These results are similar to Boehm's (1971) outcomes for kindergarten, first and second grade children, suggesting that the differences in BTBC performance between

each SES group in the present study are not unusual, and as thus the BTBC remains sensitive to SES differences at a younger age. The results of the present study also suggest that the BTBC can be administered in its entirety to pre-kindergarten children on an individual basis.

CHAPTER V

SUMMARY AND IMPLICATIONS

Summary

The Boehm Test of Basic Concepts (BTBC) is designed to assess childrens' mastery of concepts considered necessary for academic achievement during the first years of school (Boehm, 1971). Although the BTBC was normed for kindergarten through second grade children on a group administration basis, the author suggests that the test can be administered to pre-kindergarten subjects on an individual basis. The BTBC's use with pre-kindergarten children has been researched, but it has not been determined whether pre-kindergarteners' performance on the BTBC will vary with respect to socioeconomic status (SES).

The purpose of this study was to detect the amount of variability in performance among low, middle and high SES pre-kindergarteners on the entire Boehm Test of Basic Concepts. The study sought to answer the following questions. What is the distribution of BTBC scores among low, middle and high SES pre-kindergarteners? Do the scores of pre-kindergarten children vary significantly as to socioeconomic status?

The present study consisted of individually administering the BTBC, Form A (BTBC-A) to 52 pre-kindergarten

children divided among low, middle and high socioeconomic levels. The screening procedure, booklet 1, and booklet 2 of the BTBC-A were administered on separate days. During the data analysis the arithmetic means, standard deviations, standard errors of measure, t-tests for independent means, one-way analysis of variance and item analysis were conducted.

The results of the study suggest that while the high SES subjects are representative, and the low SES subjects may be representative, the middle SES subjects probably are not a representative sample. The results also suggest that children may earn higher scores on the BTBC when it is administered on an individual basis, and that preschool attendance may increase children's performance on the BTBC. The scores of both the middle (\bar{x} 37.9) and high (\bar{x} 35.5) SES groups vary significantly from the scores of the low SES (\bar{x} 25.2) group, while not varying significantly from the scores of each other. These results are similar to Boehm's (1971) outcomes for kindergarten, first and second grade children, suggesting that the differences in BTBC performance between each SES group in the present study are not unusual, and as thus the BTBC remains sensitive to SES differences at a younger age. Furthermore the results of the present study demonstrate that the BTBC can be administered in its entirety to low, middle and high SES pre-kindergarten children on an individual basis.

Implications

Research

In this study the middle SES group is probably not a representative sample, while the representativeness of the low SES group may be questionable. Future research should include a larger number of middle SES subjects from more than one preschool.

Future research might be conducted to determine if pre-kindergarten children, as well as kindergarten and first grade children, earn higher scores on the BTBC when it is administered on an individual basis. Another study might be conducted, with a larger sample of pre-kindergarten children, to determine whether the BYK percentile equivalents in the BTBC manual (Boehm, 1971) could be used to equate percentile equivalents to pre-kindergarteners' raw scores on the BTBC.

A longitudinal study could be conducted to determine if either the mean of the low SES pre-kindergarteners' BTBC scores, or one standard deviation above this mean are reliable and valid cut-off scores for identifying children who could benefit from instruction in the area of basic concepts.

Finally, future large scale research could be conducted to develop normative information on the administration of the BTBC to pre-kindergarten children.

Clinical

Although no normative data on the BTBC's administration to pre-kindergarten children are presently available, results of the current study suggest that the BTBC can be administered in its entirety to pre-kindergarten children on an individual basis. Therefore the BTBC could be administered to pre-kindergarten children as a criterion referenced test to identify concepts which each child does or does not understand.

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APPENDIX A

PARENT PERMISSION SLIP

Dear Parent or Guardian,

I am a Portland State University graduate student doing a research project in the Speech and Hearing Sciences. The purpose of this study is to determine the variability of performance of children born between October 1, 1980 and October 1, 1981 on a test of basic concepts (The Boehm Test of Basic Concepts).

I would greatly appreciate your permission for your child's involvement in this study. The project involves administering a two part basic concepts test to the children. Each portion takes 10 minutes to administer. The parts will be administered on different days. Prior to this testing, and on a different day, a hearing screening and vocabulary test (The Peabody Picture Vocabulary Test) will be administered. These will take a total of 15 to 20 minutes. The children's rights will be protected and no names will be used in the written results of the study.

Please sign the following slip, check the appropriate boxes and return it tomorrow. Thank you for your cooperation in my study. (If at any time you wish to withdraw your child from the study, you will be free to do so).

Sincerely,



Amy Ouellette

(If you have any questions please leave a message for Amy Ouellette or Dr. Casteel at the Portland State Speech and Hearing Office 229-3533)

APPENDIX A CONTINUED

Child's Name: _____

1. My child has received no more than 9 months of pre-school experience prior to this school year. Yes No
2. I permit my child to participate in this study. Yes

Signature: _____ Date: _____

APPENDIX B

DIRECTION SHEET

To the Examiner: Please become familiar with these directions, the response sheet and the test booklet for the BTBC-A.

Use the following carrier phrases for each practice and test item, as indicated on the response form: "LOOK AT THE..."; "POINT TO THE...". While telling the child where to look ("LOOK AT THE...") run a finger along the bottom of the specified pictures. When telling the child which picture in the box to point to ("POINT TO THE...") stress the underlined word on the response form. If you are not sure which picture the child pointed to, repeat the item.

Use the reinforcement phrase printed on the response form. These will encourage the child to stay on task. The phrases and when to use them are below:

-upon completing the practice items:	"Very good."
-after item #5:	"What a fast pointer you are!"
-after item #10:	"You sure are working hard"
-after item #17:	"What a good pointer you are!"
-after item #23:	"Only two more to go."

When the child is not attending, say, "Listen, (Name)." and proceed with the testing. Discontinue the test administration if the child remains inattentive.

Tell the Child: "Here is a book with some pictures in it. We are going to do different kinds of things with the pictures. Listen and do just what I say. We are going to look at the pictures and point to some of them."

APPENDIX C

RESPONSE FORM FOR THE BTBC A-1

Name_____ Birthdate_____ Age_____ BTBC Score_____ Date_____

Teacher_____ School_____ Examiner_____

Hearing Screening Passed?_____ PPVT-L Score_____ PPVT-L Age Score_____

Code Number_____

Practice Items:

<u>LOOK AT THE...</u>	<u>POINT TO THE...</u>
shoe, the hat and the sock	<u>hat</u>
things to ride in	<u>boat</u>
fruit	<u>banana</u>

REINFORCEMENT- "Very good."

Test Items:

<u>LOOK AT THE...</u>	<u>POINT TO THE...</u>
1. picture of writing paper and stars	paper with the star at the <u>top</u>
2. beads and the string	bead with a string <u>through</u> it
3. table and the boxes	box that is <u>away from</u> the table
4. toys	toy that is <u>next to</u> the truck
5. picture of the house and the boy	house that has the boy <u>inside</u> it

REINFORCEMENT- "What a fast pointer you are!"

6. boxes and the marbles	box that has <u>some but not many</u> marbles	
7. flowers	flower that is in the <u>middle</u>	
8. plates of cupcakes	plate that has a <u>few</u> cupcakes	
9. boats	boat that is <u>farthest</u> from the shore	
10. boxes and the circles	box that has circles <u>around</u> it	

REINFORCEMENT- "You sure are working hard."

11. Balloons and the tree	balloon that is <u>over</u> the tree	
12. doors	door that is the <u>widest</u>	
13. boxes of eggs	box that has the <u>most</u> eggs	
14. jars, cups and spoons	thing that is <u>between</u> the spoons	
15. cakes	cake that is <u>whole</u>	
16. boys going to school	boy who is <u>nearest</u> the door	
17. animals walking in a line	<u>second</u> animal	

REINFORCEMENT- "What a good pointer you are!"

APPENDIX C CONTINUED

LOOK AT THE...

18. glasses on the table

19. groups of animals

20. sofa and the toys

21. groups of trees

22. groups of blocks

23. picture of a girl

REINFORCEMENT- "Only two more to go."

24. bottles

25. pies

POINT TO THE...

glass that is at the corner of the table

group that has several rabbits

toy that is behind the sofa

group where all the trees are in a row

group that is different from the others

picture that shows how the girl looked after her hair was cut

one that is almost empty

pie that is half gone

	+	-
18. glasses on the table		
19. groups of animals		
20. sofa and the toys		
21. groups of trees		
22. groups of blocks		
23. picture of a girl		
REINFORCEMENT- "Only two more to go."	X	X
24. bottles		
25. pies		

Raw Score: _____

APPENDIX C CONTINUED

RESPONSE FORM FOR THE BTBC A-2

Name _____ Birthdate _____ Age _____ BTBC Score _____ Date _____
 Teacher _____ School _____ Examiner _____
 Hearing Screening Passed? _____ PPVT-L Score _____ PPVT-L Age Score _____

Code Number _____

Practice Items:

LOOK AT THE....

POINT TO THE...

spoon, glass and cup

glass

furniture

table

animals

dog

REINFORCEMENT- "Very good."

Test Items:

LOOK AT THE....

POINT TO THE...

1. circles and the boxes

box that is at the center of
the circle

2. box of marbles and the
groups of marbles

group that has as many marbles
as the box

3. box and the circles

circle that is at a side of the box

4. trees and squirrels

squirrel that is beginning to climb
a tree

5. desserts. One is an ice
cream and one is a piece of
pie

other dessert

REINFORCEMENT- "What a fast pointer you are!"

6. shapes

shapes that are alike

7. cars going into the tunnel

car that is not the first or the
last

8. chair, the apple and the
cookie

one a child never eats

9. table

(OMIT "TO THE) below the table

10. boxes and the balls

ball that matches one of the boxes

REINFORCEMENT- "You sure are working hard."

11. dog, the book and the ear

one a child always has

12. fish

fish that is medium-sized

13. boxes and the line

box that is over the right end
of the line

14. boys

boy who is bending forward

15. boxes and candies

box that has zero candies

APPENDIX C CONTINUED

<u>LOOK AT THE...</u>		<u>POINT TO THE...</u>	
16. cloud and the airplanes		airplane that is <u>above</u> the clouds	+
17. picture of bowls and spoons		picture that shows a spoon in <u>every</u> bowl	-
REINFORCEMENT- "What a good pointer you are!"			
18. beads		beads that are <u>separated</u>	
19. birds		bird on the <u>left</u>	
20. picture of the candles		picture that shows a <u>pair</u> of candles	
21. boxes		*(Omit "POINT TO THE...") <u>skip</u> a box and point to the next box	
22. pictures of lollipops		pictures that have <u>equal</u> numbers of lollipops	
23. boxes of circles		box where the circles are <u>in order</u> from large to small	
REINFORCEMENT- "Only two more to go."			
24. teacher and the children		<u>third</u> child from the teacher	
25. groups of stars		group that has the <u>least</u> stars	

Raw Score: _____

*Tell the child to put his/her finger on the first box, ("Put your finger here."). Continue with the item directions.